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Jones

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(54) **WEAR ASSEMBLY FOR EXCAVATING
DIGGING EDGE**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 482 days.

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(21) Appl. No.: **11/216,697**

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Related U.S. Application Data

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Primary Examiner—Thomas A Beach

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403/378, 379

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See application file for complete search history.

(57) **ABSTRACT**

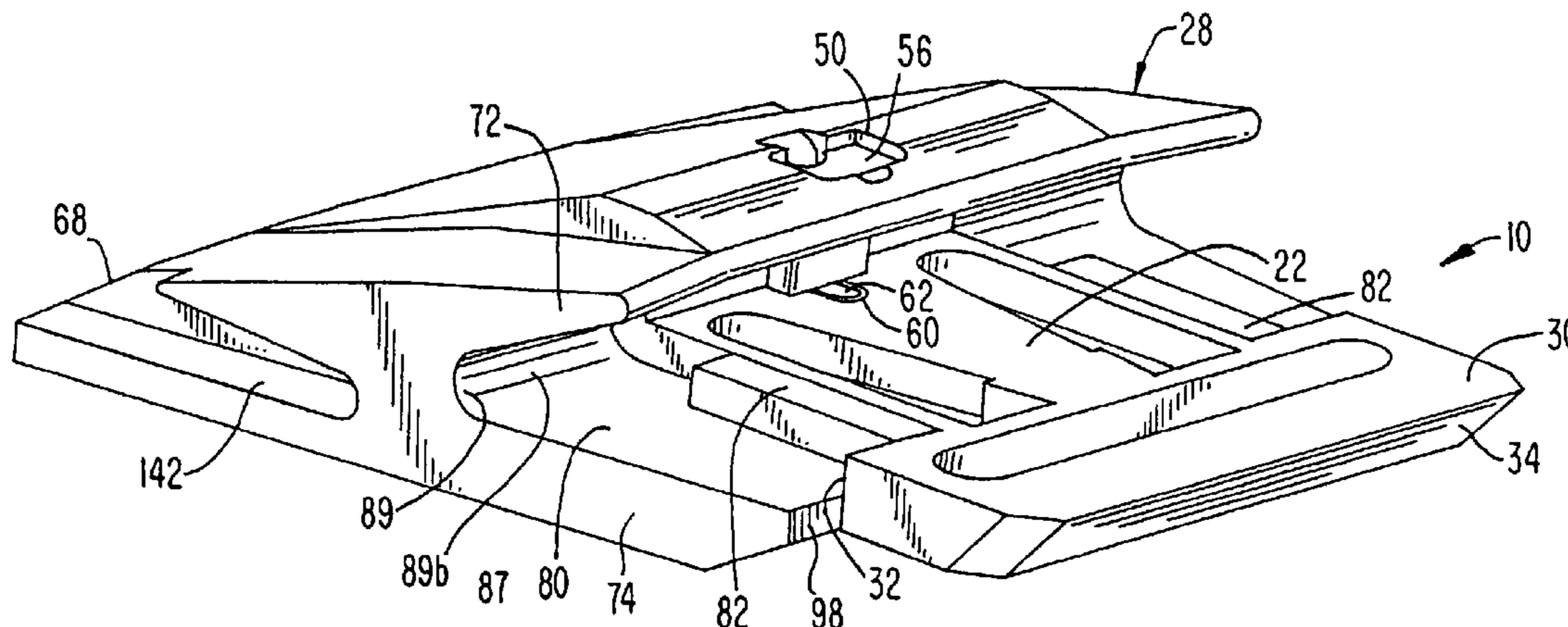
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A wear assembly that includes a wear member and a boss to define an opening for receiving a lock forward of the front edge face of the lip which can mount the wear member in a stable and balanced manner without a through-hole in the lip. The wear member includes an aperture and a rib to define bearing faces on opposite sides of a central plane of the lip. The boss includes rails to hold the wear member in place, and a brace at the rear end, which supports the rails on the boss, abuts the rear of the wear member to reduce the loading on the lip, and deflects earthen material away from the wear member under reverse loading.

16 Claims, 14 Drawing Sheets



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FIG. 1

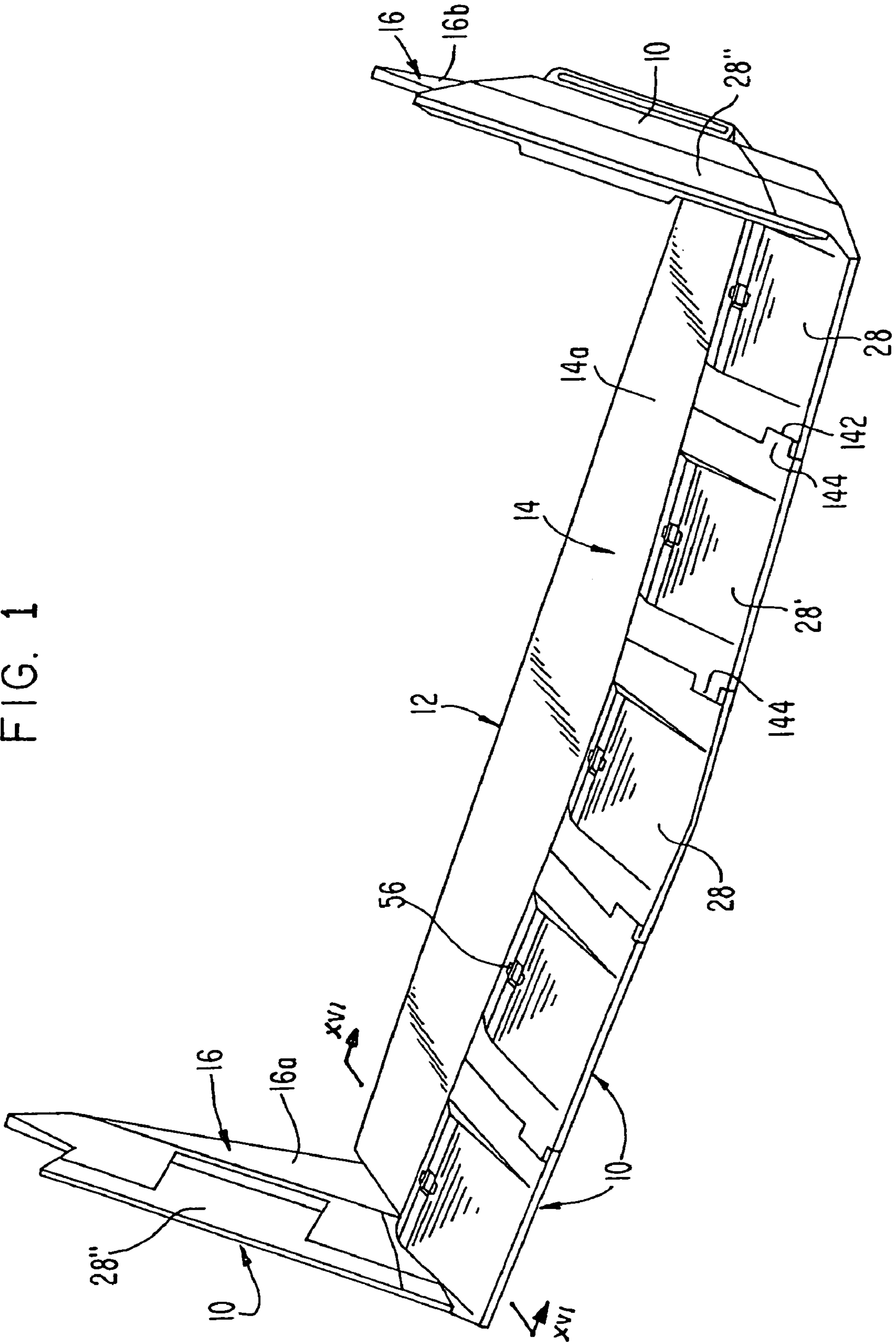
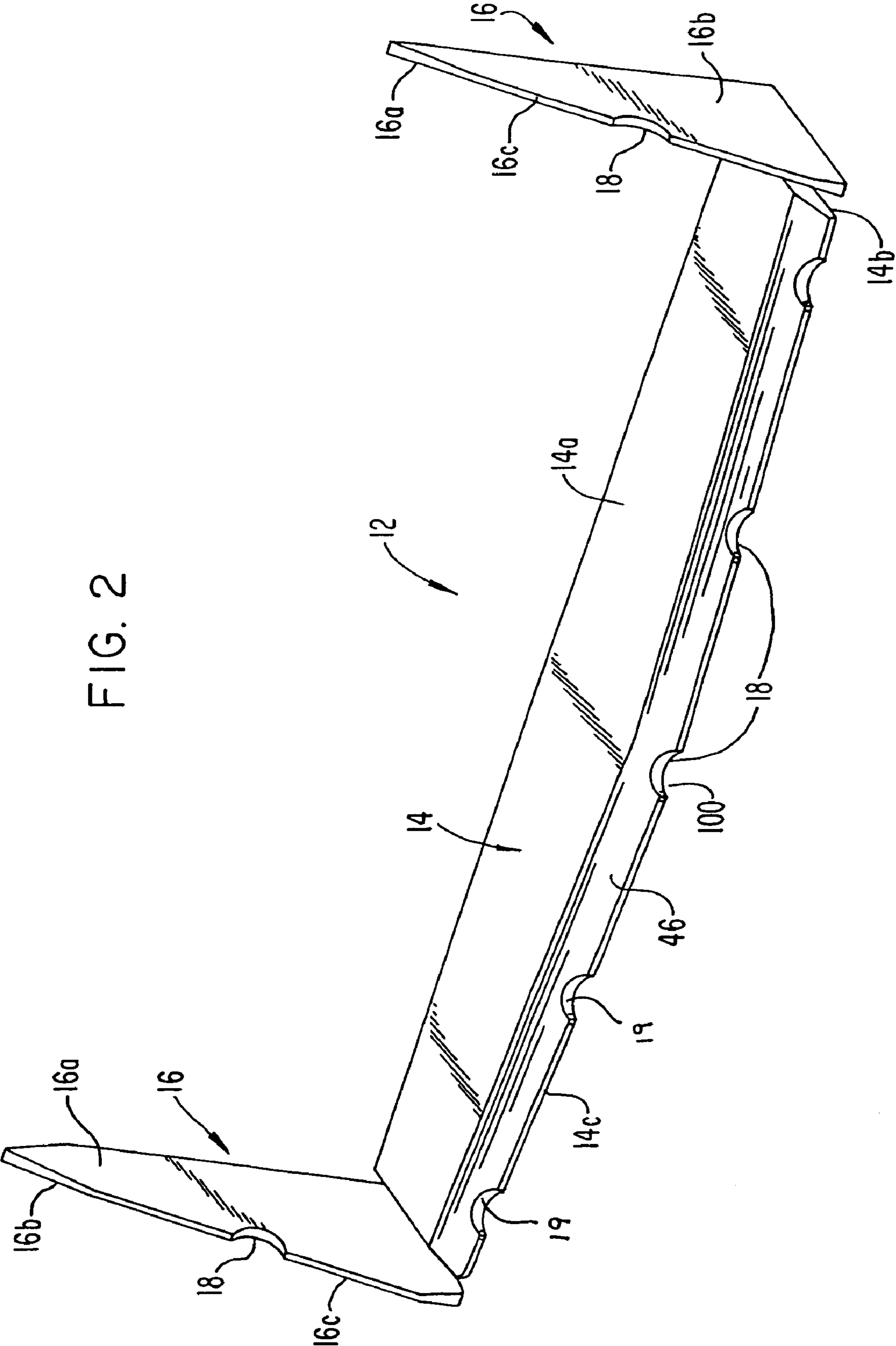


FIG. 2



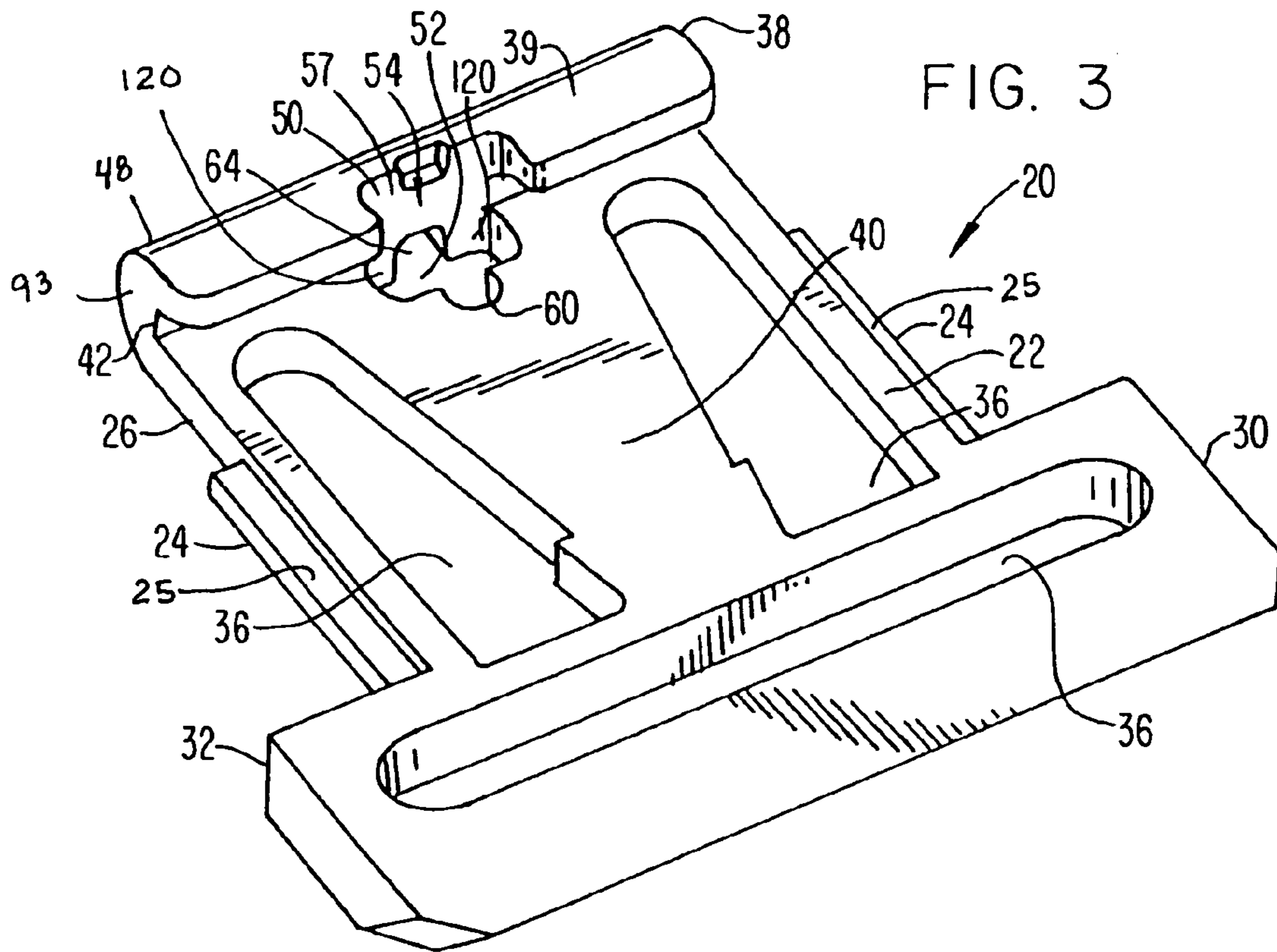


FIG. 3

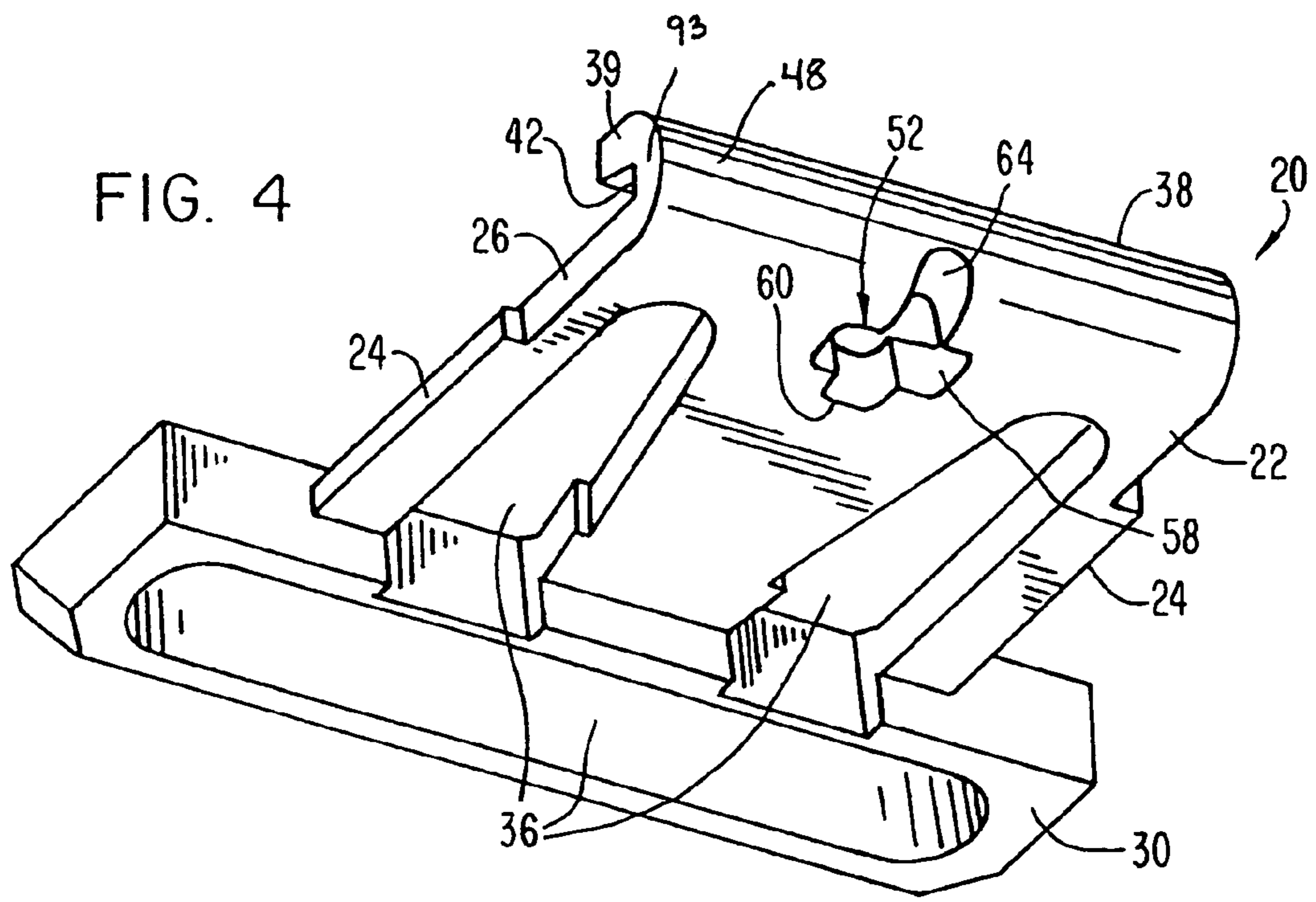


FIG. 4

FIG. 5

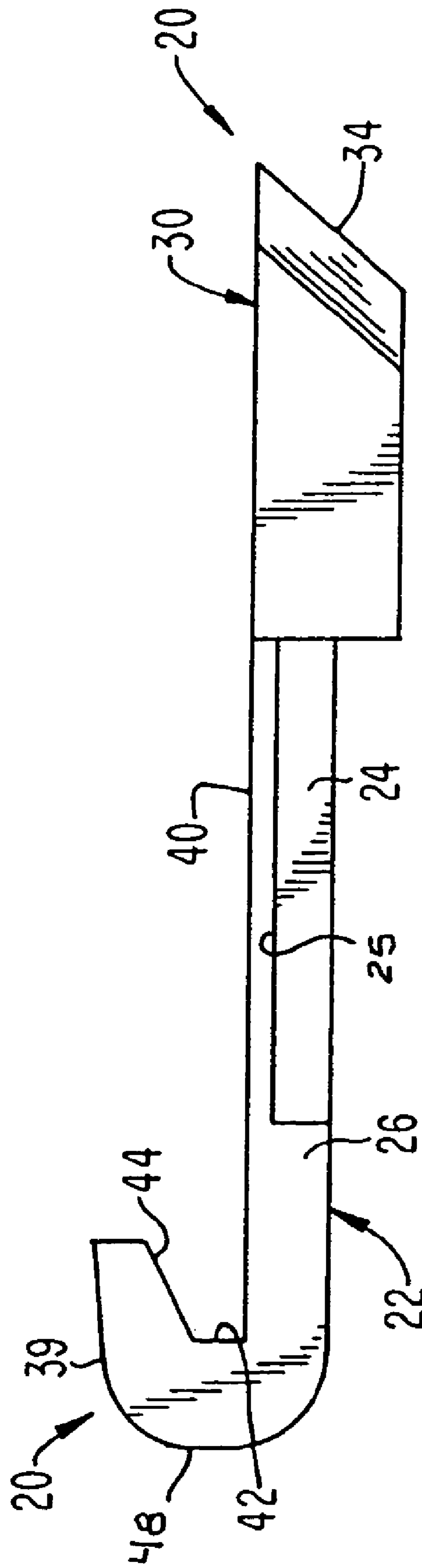


FIG. 6

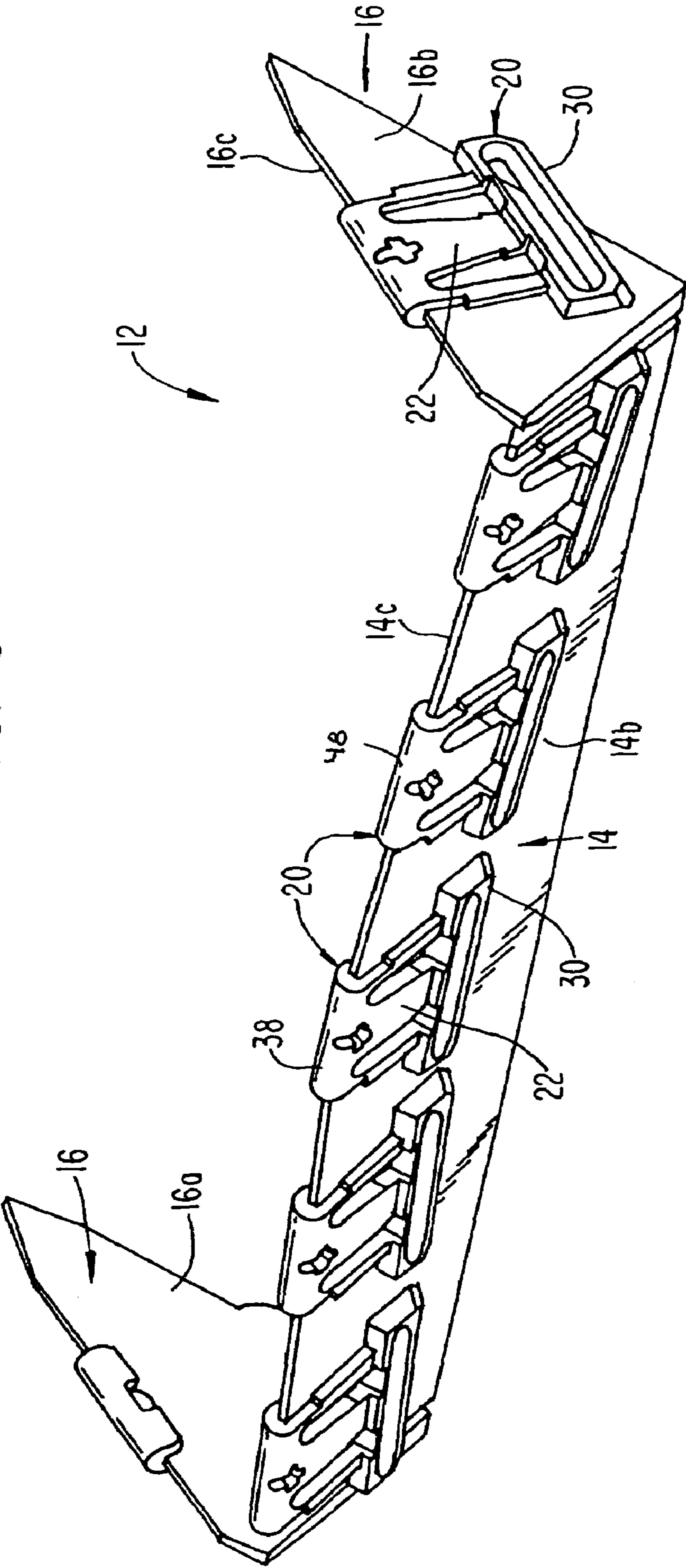


FIG. 7

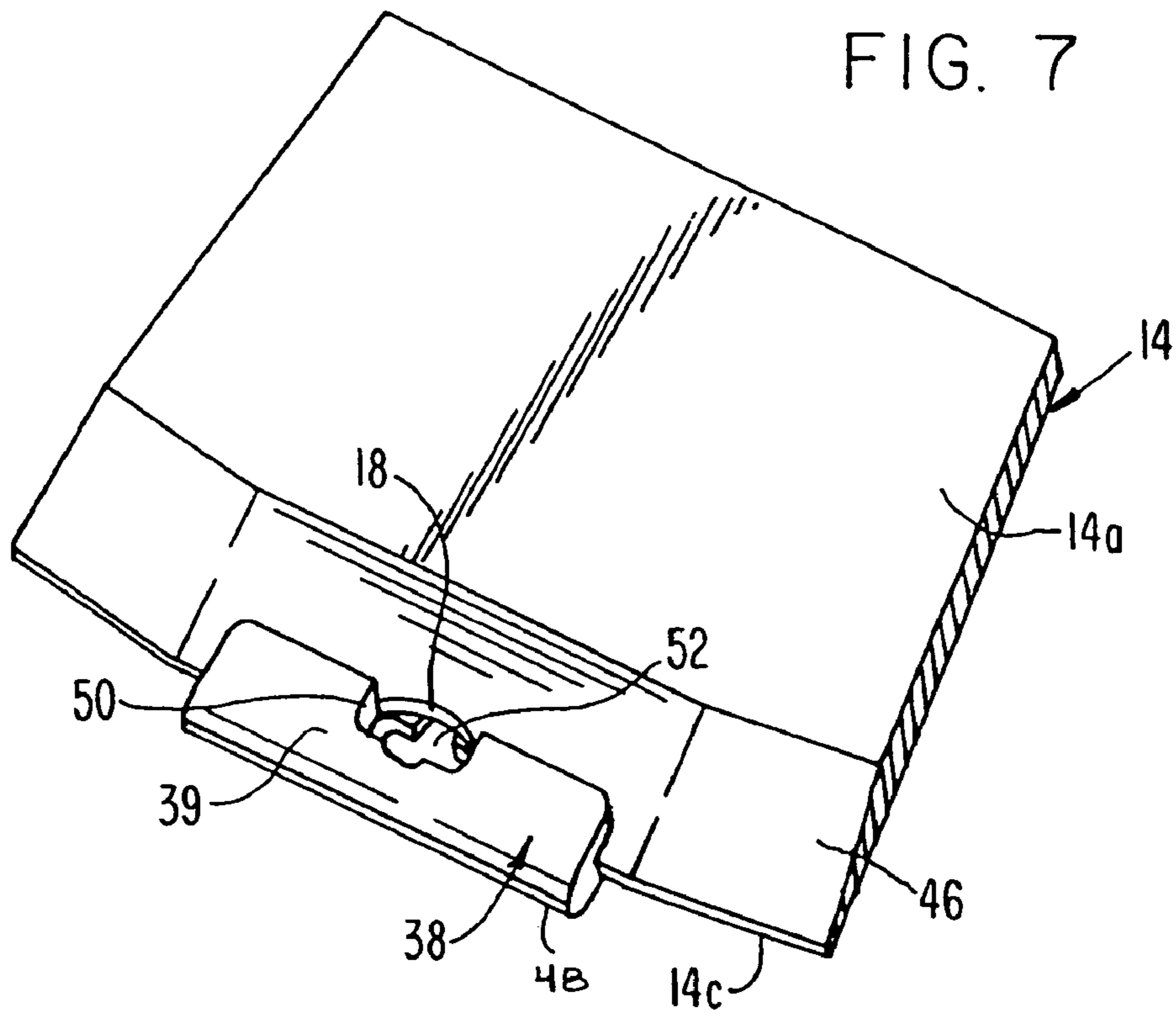
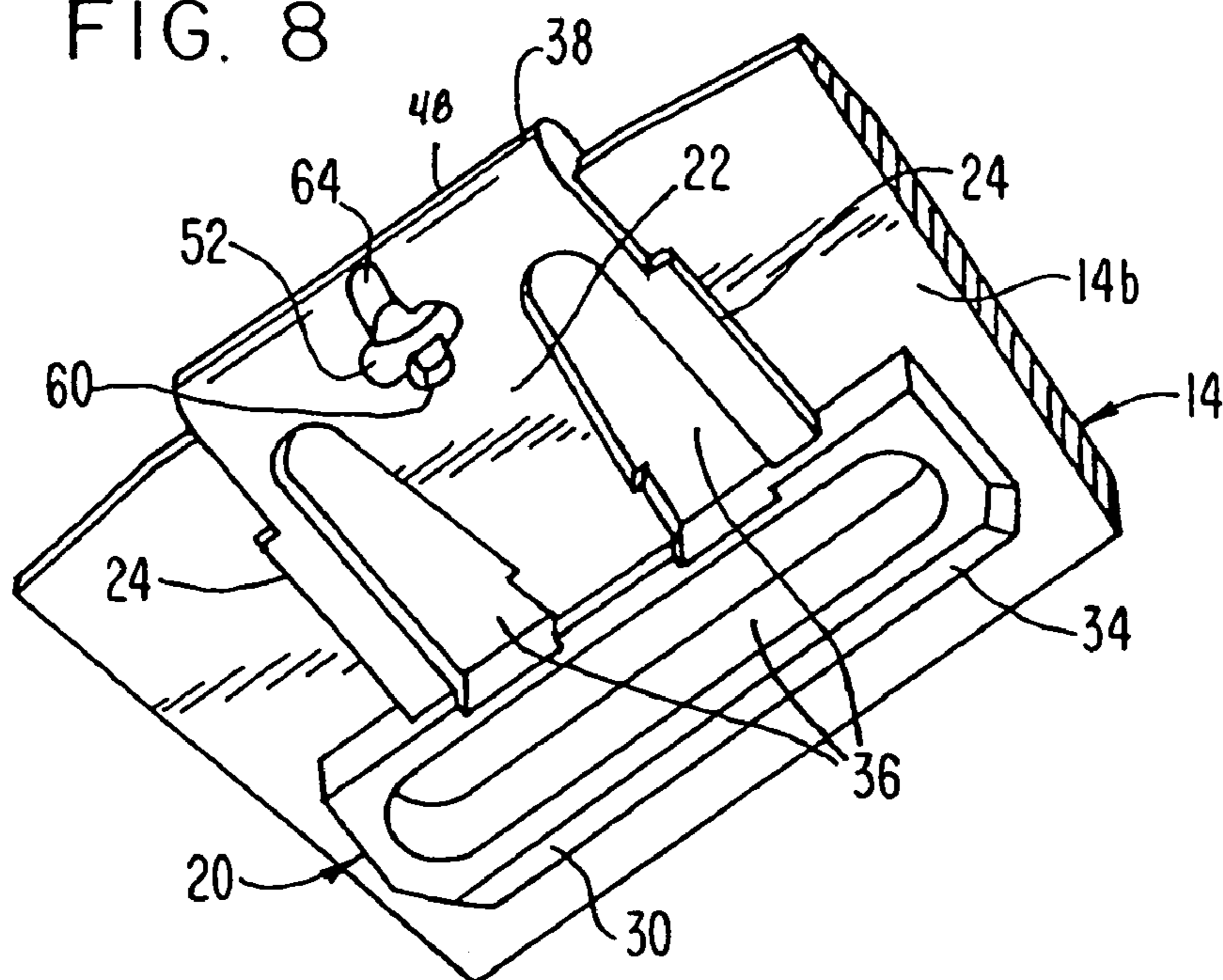


FIG. 8



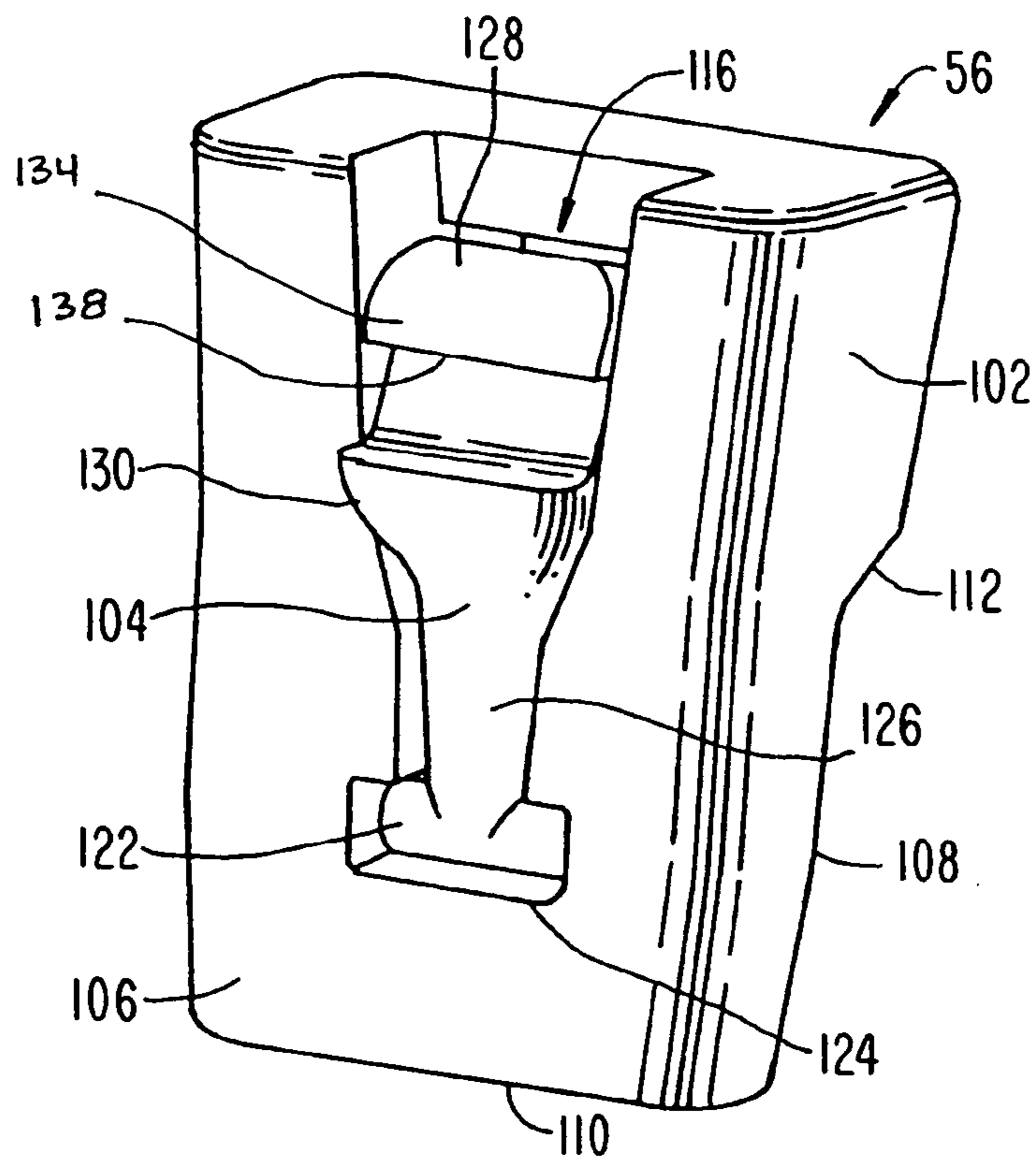


FIG. 9

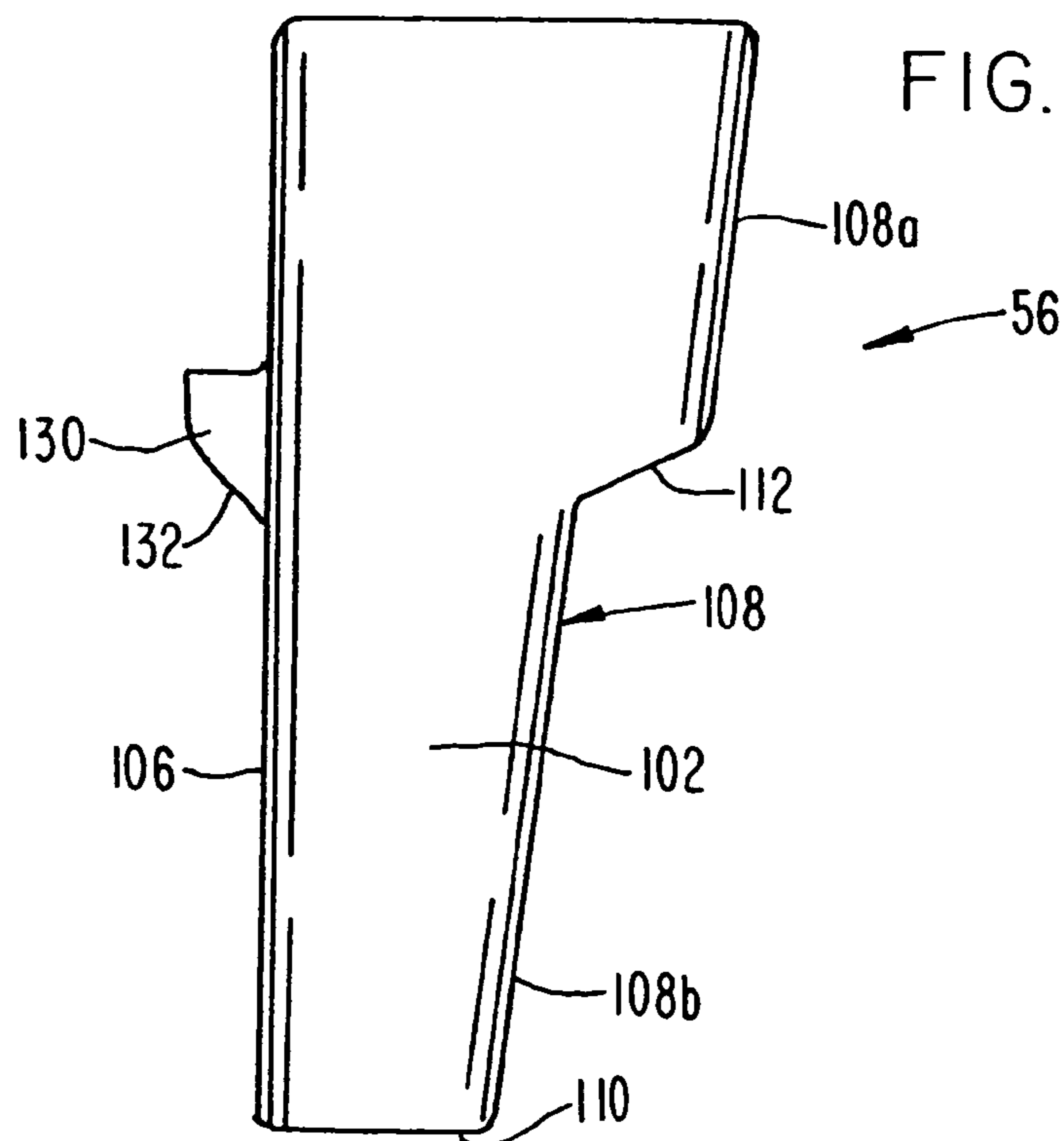


FIG. 10

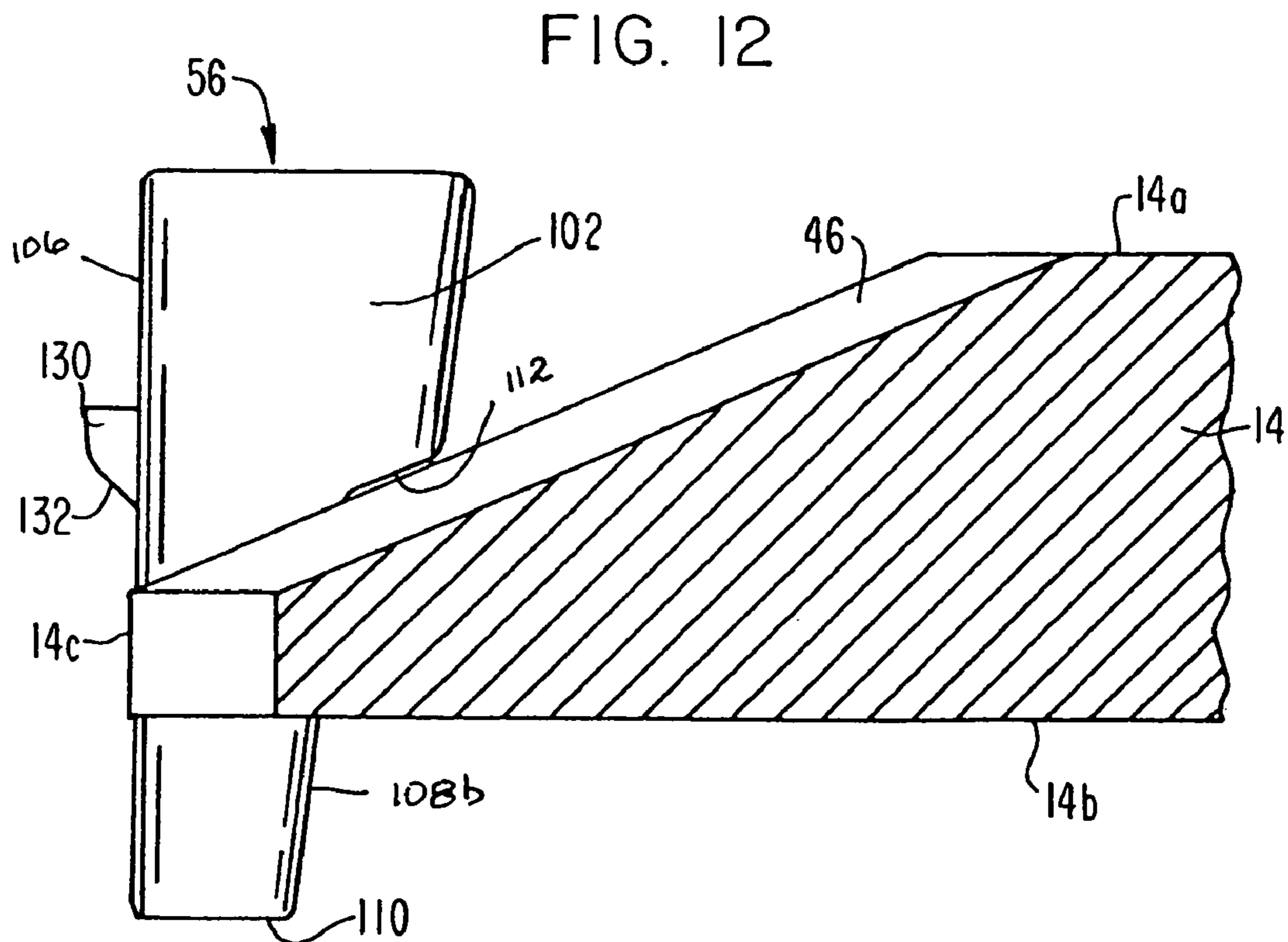
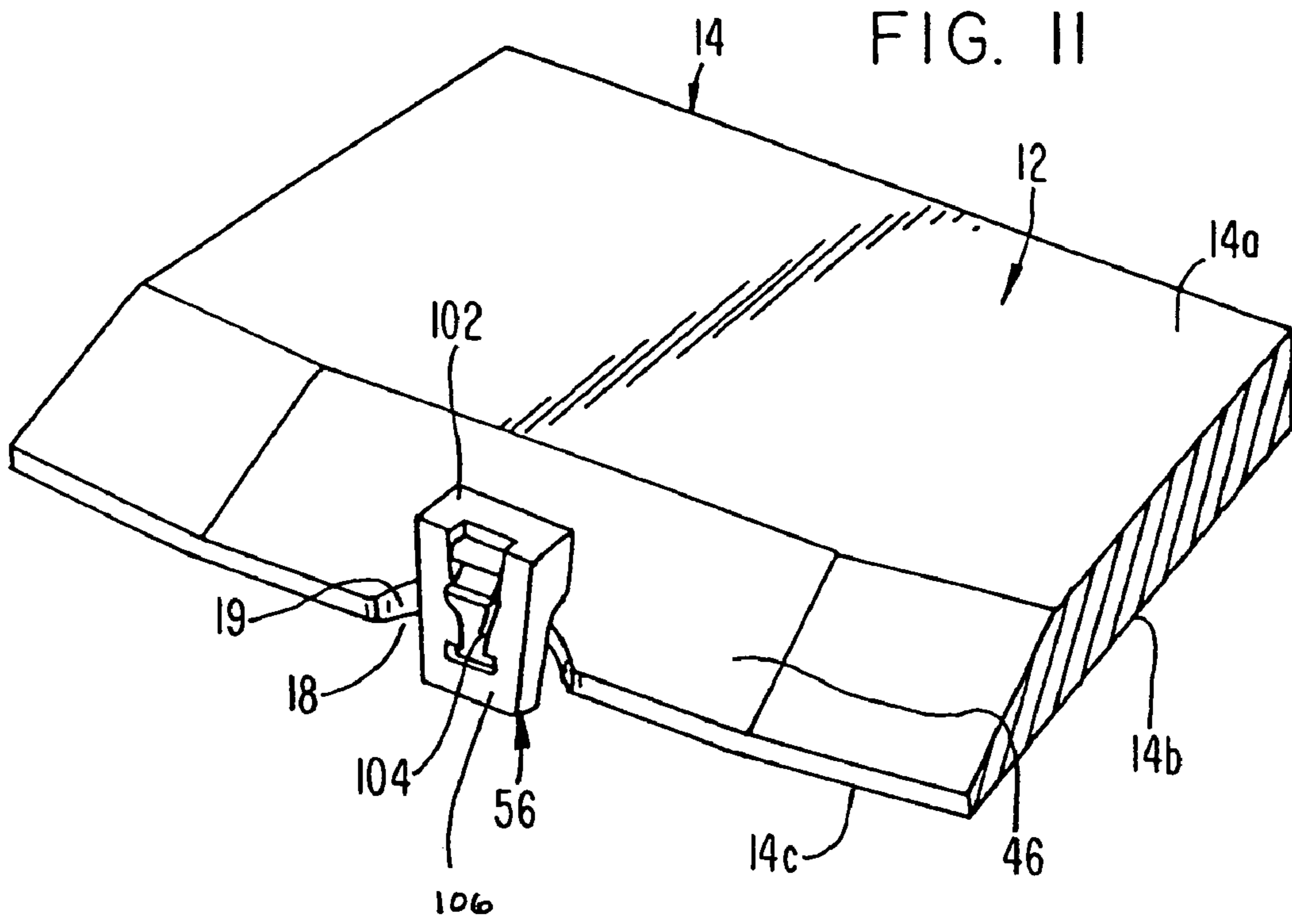


FIG. 13

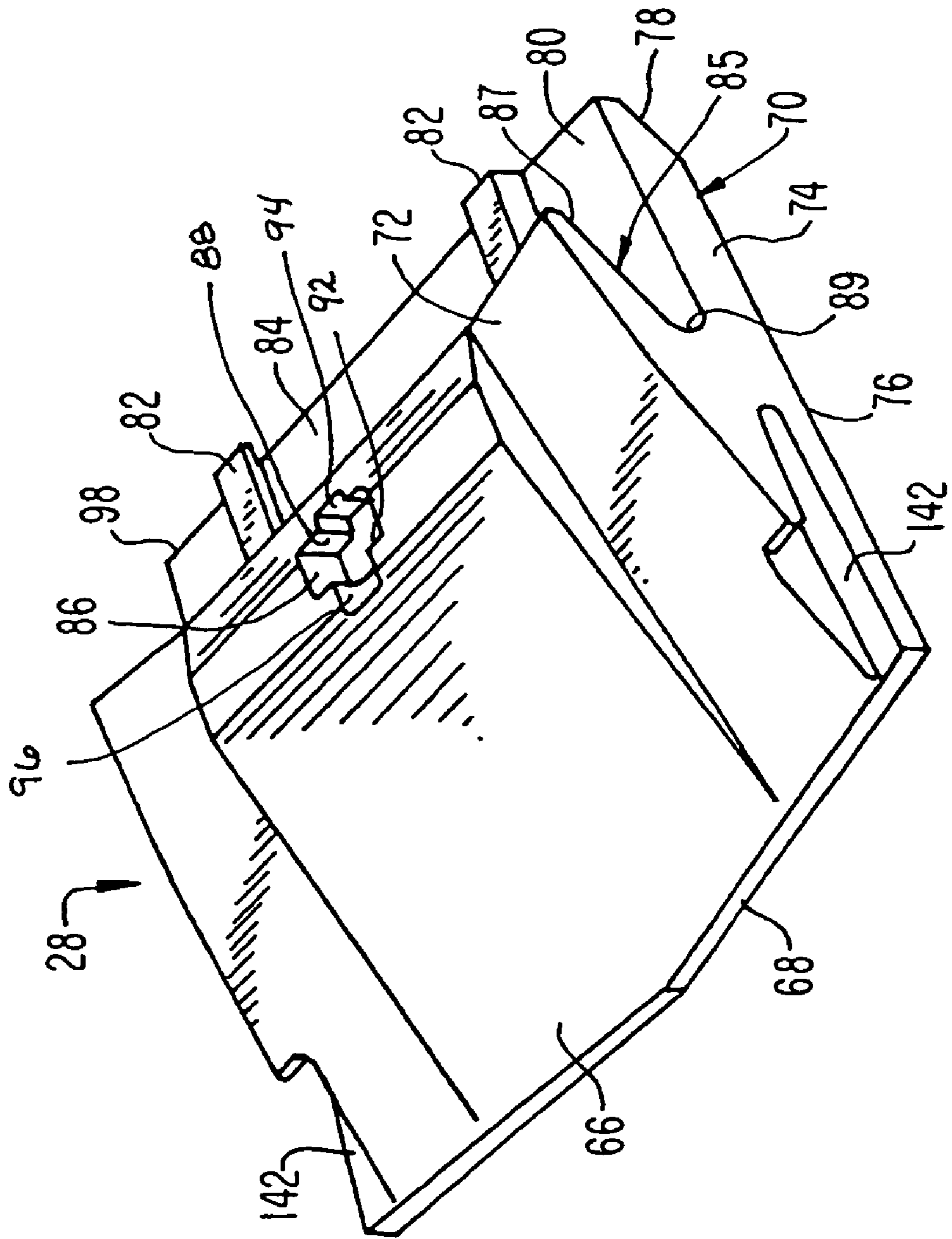


FIG. 14

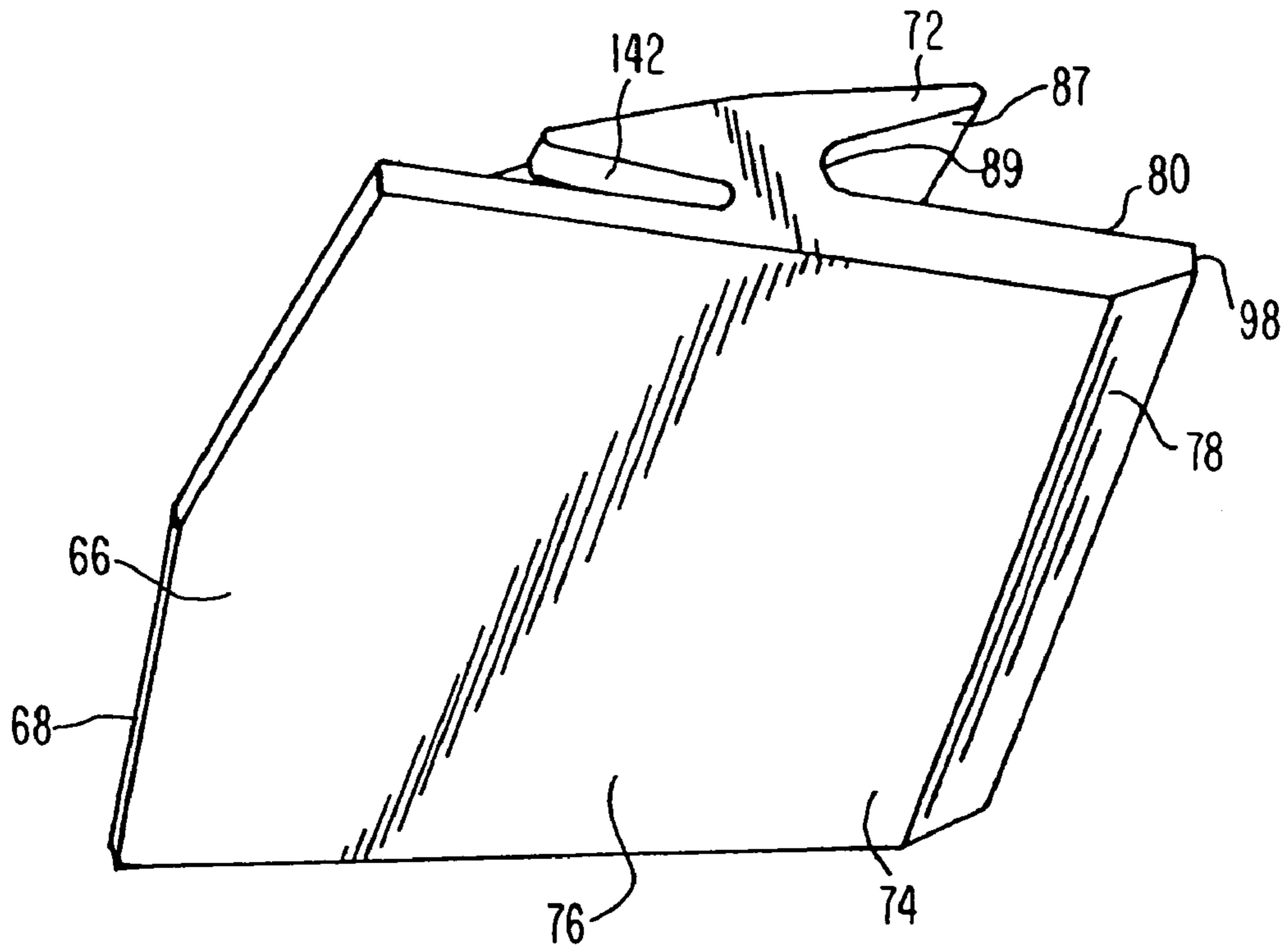


FIG. 15

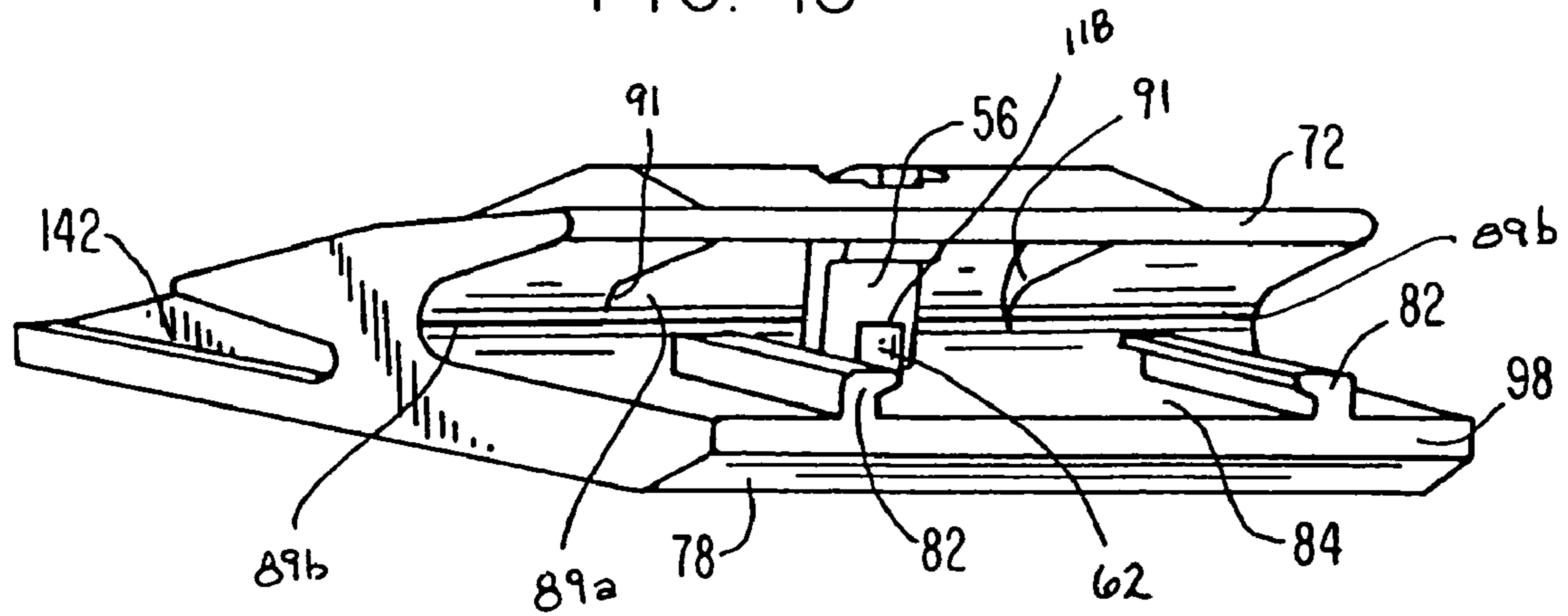


FIG. 16

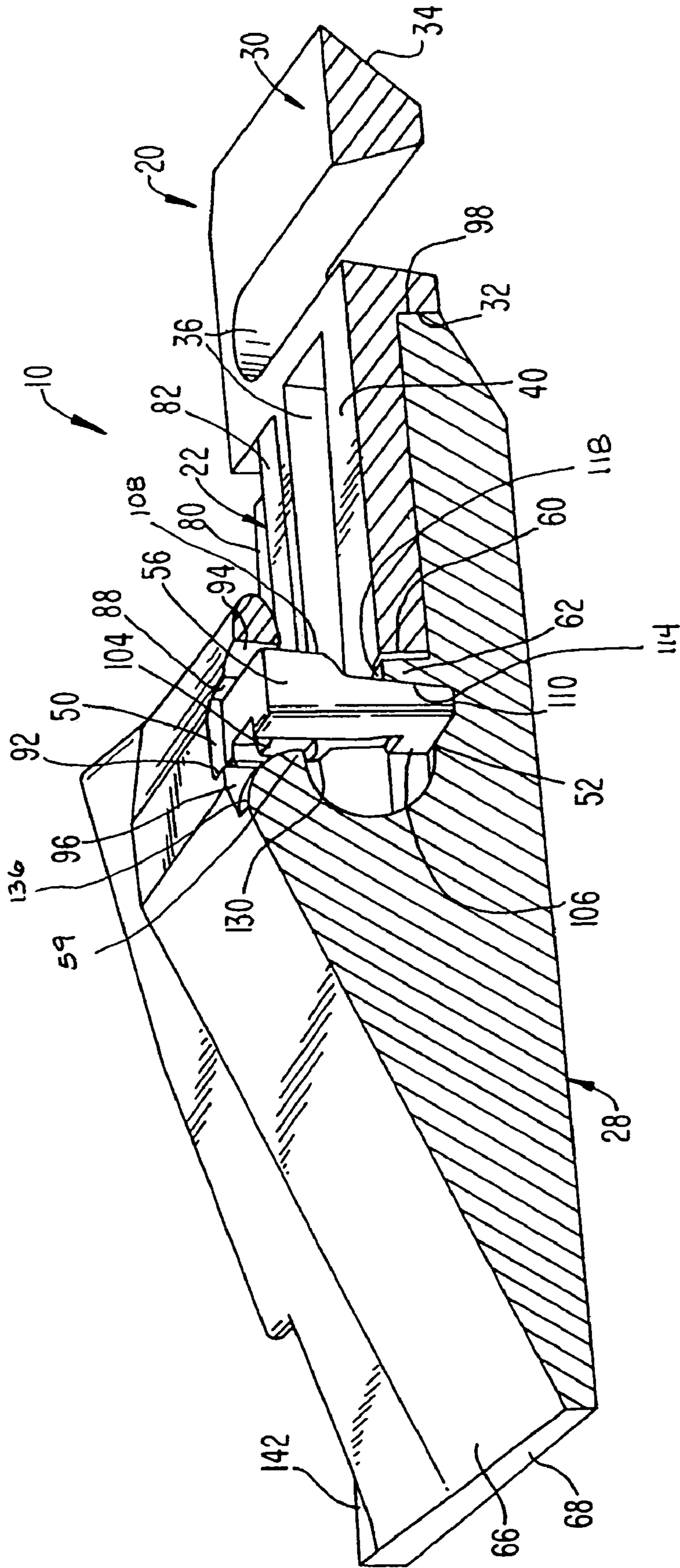


FIG. 17

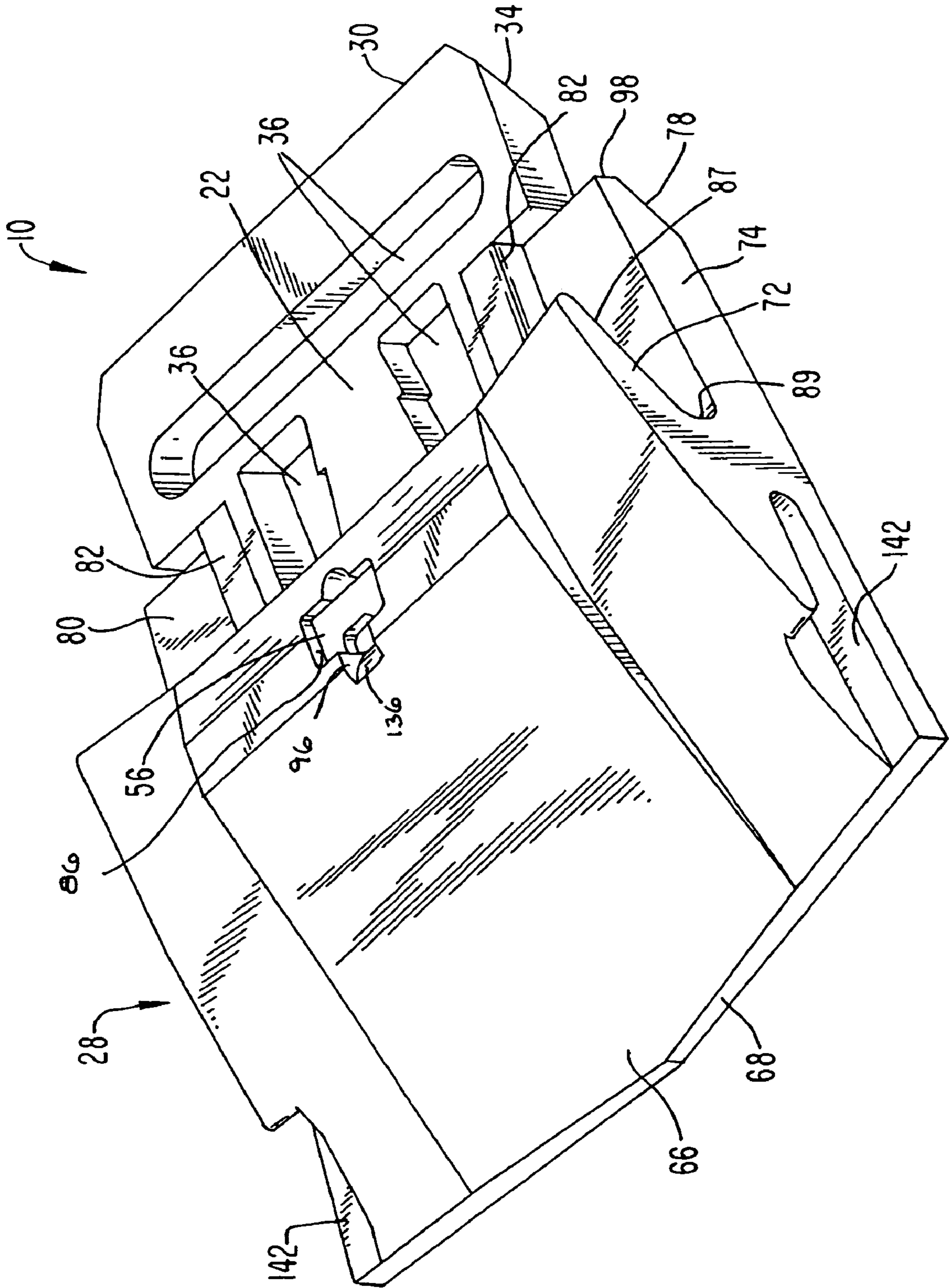
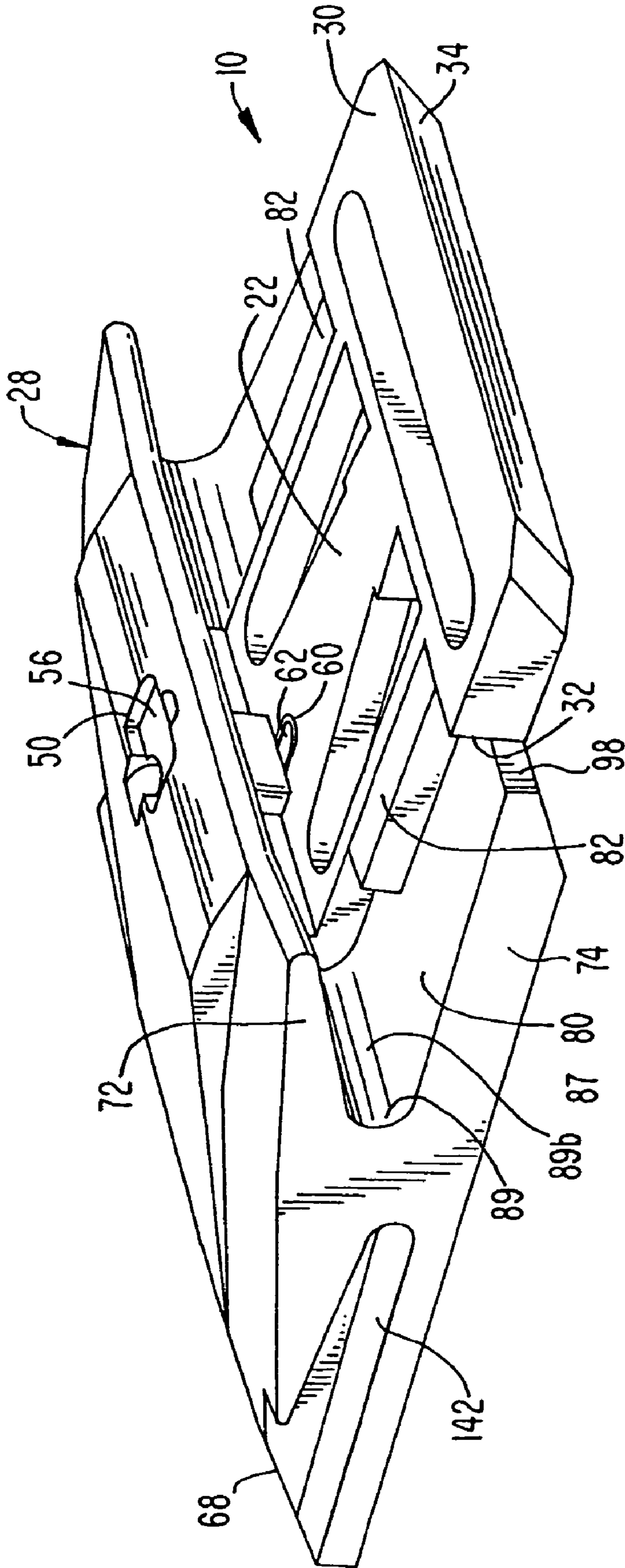


FIG. 18



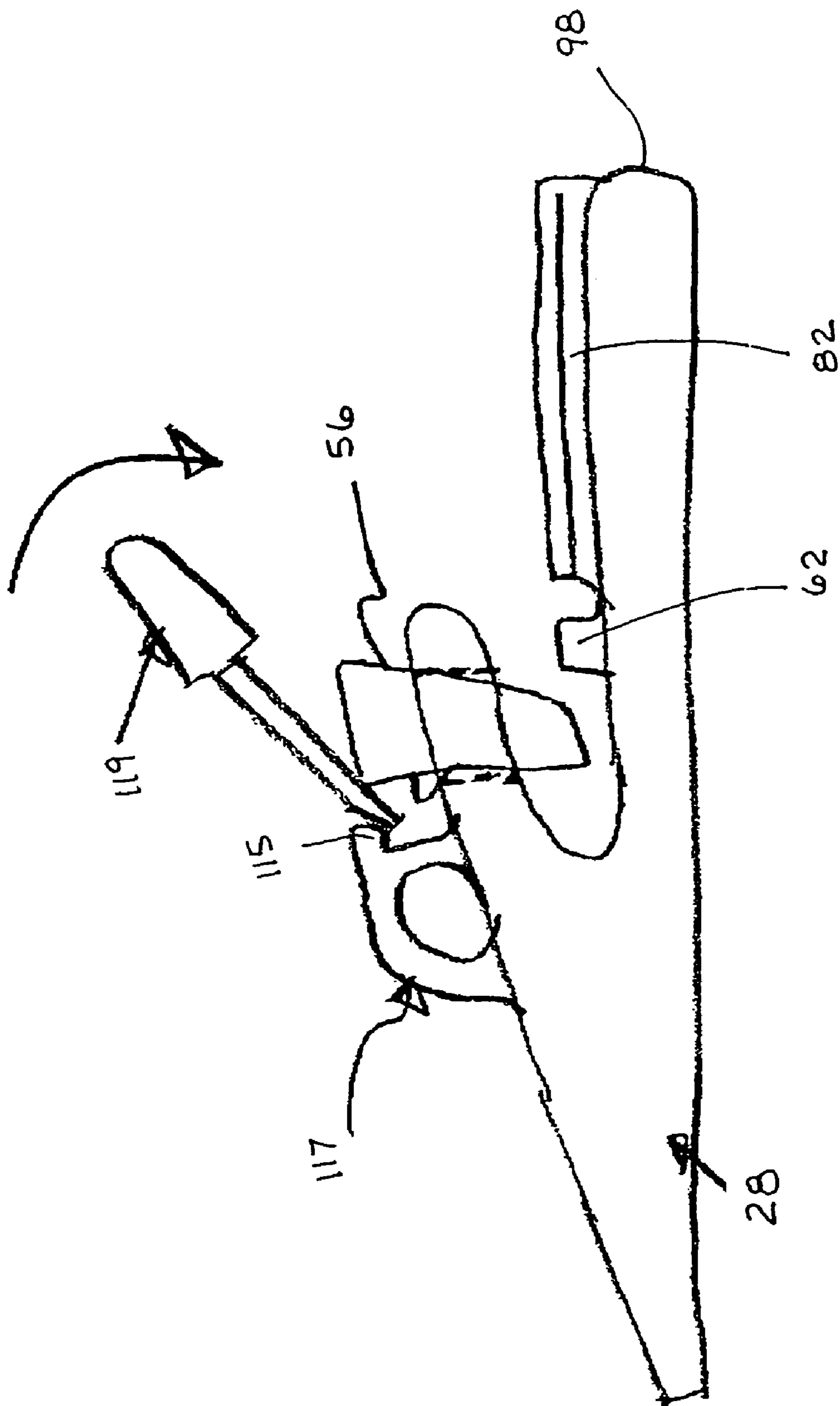


FIG. 19

WEAR ASSEMBLY FOR EXCAVATING DIGGING EDGE

This application is a continuation of U.S. patent applica-
tion Ser. No. 10/425,605 filed Apr. 30, 2003, now U.S. Pat. 5
No. 7,080,470.

FIELD OF THE INVENTION

The present invention pertains to a wear assembly for pro- 10
tecting the front edge of a structure subjected to wear, and is
particularly suited for use along the front digging edge of an
excavating bucket or the like.

BACKGROUND OF THE INVENTION

Excavating buckets and other excavating equipment are
typically subjected to harsh conditions. A series of wear
members are usually provided to protect the digging edges
from premature wear. Wear members have been secured to the 20
digging edge in many different ways.

For example, in U.S. Pat. No. 4,570,365 to Bierwith, the
wear members are secured to the lip of the bucket by the use
of a wedge and spool lock arrangement that is fit through a
hole in the lip spaced from the front edge. In this arrangement, 25
the spool pinches the rear parts of the wear member against
the inner and outer faces of the lip as the wedge is driven into
the hole. However, under load, the legs of the wear member
can shift and cause loosening of the lock and possible loss of
the wear member. In addition, the formation of a hole in the 30
lip weakens the lip and its ability to effectively resist the large
loads applied as the lip is forced into the ground.

In U.S. Pat. No. 3,995,384 to Wood and U.S. Pat. No. 4,
748,754 to Schwappach, the hole in the lip is eliminated and
replaced with a lateral boss that is welded to the inner face of 35
the lip generally parallel to the front edge. While these con-
structions avoid weakening the lip with a through-hole, they
place very large loads on the lateral boss, and thus, can only be
reliably used in low stress environments.

In U.S. Pat. No. 5,088,214, the wear member is secured by 40
a boss that is welded to the inner face of the lip so as to extend
generally normal to the front edge. The wear member, then, is
slipped over the boss via a complementary slot. As can be
appreciated, this orientation of the boss greatly reduces the
loads on the boss as compared to the lateral bosses. Never- 45
theless, the wear member is typically secured by a single lock
located to one side of the lip. While this is adequate for most
applications, this arrangement does orient the lock in an off-
center relationship relative to the lip and thus engenders
increased vertically oriented stresses on the legs of the wear 50
member as well as the lip. Greater balance in resisting the
loads applied to the wear member can be achieved by utilizing
a boss and lock for the inner and outer legs (see, e.g., FIG. 5
of the '214 patent). However, this construction requires more 55
steel and twice as many bosses and locks for the attachment of
each wear member.

As a result, there is a need for an improved assembly for
attaching a wear member to the digging edge of an excavator
that avoids the problems of the prior art.

SUMMARY OF THE INVENTION

In accordance with one aspect of the invention, the wear
member is secured to the lip of an excavator (e.g., an exca-
vating bucket) in a stable and balanced manner without the 65
formation of a through-hole in the lip. In a preferred construc-
tion, the wear assembly includes a boss and a wear member

that cooperate to define a passage forward of the front edge
face of the lip for receiving the lock. In this way, the lock
can be engaged on each side of the central plane of the lip. The lip
can be maintained as an imperforate member for greater
strength and durability.

In another aspect of the present invention, the lip of the
excavator includes an inner face, an outer face and a front
edge face. The front edge face includes a plurality of spaced
scallops. The scallops cooperate with the wear assembly to
permit a through-hole for the lock to be formed forward of the
lip without undue forward projection of the boss. The scallops
are preferably formed by a concave wall that extends no more
than about 180 degrees about an axis that is generally perpen-
dicular to the lip. In this way, the scallop can provide the
desired space for the lock without causing significant weak- 15
ening of the lip.

In one other aspect of the invention, the wear member
includes a pair of spaced bearing surfaces to contact the lock
generally on opposite sides of the central plane of the lip. In a
preferred construction, the wear member is bifurcated to
define a pair of rearward legs. One of the legs includes an
aperture into which the lock is received. A bearing surface
associated with the aperture engages the lock on one side of
the central plane of the lip to hold the wear member in place. 20
The other leg includes a rib that extends toward the aperture.
The rib includes a bearing surface to engage the lock on an
opposite side of the central plane of the lip.

In another aspect of the invention, a boss includes a front
part that extends along the front edge face of the lip and a body
that extends along the inner or outer face of the lip. The body
defines a hole forward of the front edge face of the lip to
receive the lock for securing the wear member in place. In the
preferred construction, the front part wraps around the lip to
define a finger portion that opposes the body. The front part
defines an opening that is aligned with the hole in the body to
define a passage into which the lock is inserted. 30

In another aspect of the invention, the boss includes a body
that extends along one of the faces of the lip. Rails extend
along opposite sides of the boss to cooperate with a comple-
mentary structure on the wear member to hold the wear mem-
ber in place. A brace extends laterally beyond at least part of
the body and is fixed to the rails to provide enhanced support
to the rails.

In one other aspect of the invention, the boss includes a
body that extends along one of the faces of the lip and a brace
at a rear end of the body. The brace extends beyond the body
in a transverse direction to define a front bearing face against
which a rear wall of the wear member can abut. In this way, 45
the applied forces and stresses on the lip can be reduced to
thereby lessen the maintenance requirements and lengthen
the usable life of the lip.

In another aspect of the invention, the boss is formed with
a raised deflector that tends to deflect earthen material away
from the wear member when the excavator is reversed. In the
preferred construction, the deflector is formed at the rear end
of and extends farther from the lip than the forward portions
of the boss to be juxtaposed to the rear wall of the wear
member. An inclined deflector face is preferably formed to
reduce the forces applied to the deflector under reverse load- 60
ing.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a lip of an excavating bucket
provided with wear assemblies in accordance with the present
invention.

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FIG. 2 is a perspective view of the lip in accordance of the present invention.

FIG. 3 is top perspective view of a boss in accordance with the present invention.

FIG. 4 is a bottom perspective view of the boss.

FIG. 5 is a side view of the boss.

FIG. 6 is a perspective view of a series of the bosses attached to the lip.

FIG. 7 is an enlarged top perspective view of one of the bosses attached to the lip.

FIG. 8 is an enlarged bottom perspective view of one of the bosses attached to the lip.

FIG. 9 is a perspective view of a lock in accordance with the present invention with the elastomer omitted.

FIG. 10 is a side view of the lock.

FIG. 11 is a perspective view of the lock and its relation to the lip during use.

FIG. 12 is a side view of the lock and its relation to the lip during use.

FIG. 13 is a top perspective view of a wear member in accordance with the present invention.

FIG. 14 is a bottom perspective view of the wear member.

FIG. 15 is a rear view of the wear member and its relation to the lock during use.

FIG. 16 is a cross-sectional view taken along line XVI-XVI in FIG. 1.

FIG. 17 is a top, front perspective view of the wear assembly with the lip omitted.

FIG. 18 is a rear perspective view of the wear assembly with the lip omitted.

FIG. 19 is a side view of the wear member provided with a lifting eye.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

In accordance with the present invention, a wear assembly 10 is provided for attachment along the digging edge of a lip of an excavator. The invention is discussed below in terms of the attachment of a shroud to the lip of a load-haul-dump (LHD) bucket. However, the invention is not limited to the attachment of a shroud or an LHD bucket. The invention could be used to secure other wear members to other excavators, and even to other equipment where the edge is subject to heavy loading and wear as in an excavating environment.

The invention is at times discussed in terms of relative terms, such as up, down, right, left, vertical, horizontal, etc. for the sake of easing the description. These terms are to be considered relative to the orientation of the elements in FIG. 1 (unless otherwise noted), and are not to be considered limitations on the invention. As can be appreciated, the wear member can be used and oriented in a variety of ways.

Lip 12 forms the front digging edge of an LHD bucket (not shown) to engage and penetrate into the ground for the gathering of earthen material. As seen in FIG. 2, lip 12 includes a center section or main member 14 that extends horizontally across the front of the bucket and a pair of corner sections 16 generally at right angles to the center section. Corner sections 16 form the lower ends of the front edges of the bucket sidewalls. Each of the lip sections includes an inner face 14a, 16a, an outer face 14b, 16b, and a front edge 14c, 16c. No through-holes are formed in the lip sections. Hence, the lip is able to provide a strong base to amply resist the high forces applied during use.

The front edges 14c, 16c of lip sections 14, 16 are defined with spaced scallops or recesses 18, one for each wear assembly 10. In the illustrated example, five uniformly spaced

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scallops are formed along front edge 14c, and one scallop in each of front edges 16c. The scallops are each preferably formed to have a uniform, continual, arcuate surface 19 with a curvature that extends no more than about 180 degrees about an axis extending generally perpendicular to the lip, and preferably is at about 180 degrees. In this way, lip 12 with scallops 18 can be easily manufactured, provide a robust base to resist the applied loads, and (as discussed below) provide clearance for the lock of wear assembly 10 during use. Nevertheless, the scallops could be formed to have a non-uniform curvature, a discontinuous or angular shape, and/or be formed to have partial closure (i.e., a surface with more than a 180 degree extension such that certain side portions of the scallop are opposed to each other). Each of these variations, though, tends to increase the cost of manufacture, lead to more significant stress concentrations, and/or reduced strength.

As shown in FIG. 6, a boss 20 is fixed to lip 12 over each scallop 18. While bosses 20 are preferably welded to the lip, they could be cast as an integral part of the lip or secured by mechanical means. In addition, the bosses could each be formed as a multiple of parts, which are integral or spaced apart, although a one-piece member is preferred for simplicity and strength.

Boss 20 has a body 22 extending along outer face 14b of lip 12 (FIGS. 3-5). Body 22 preferably includes a pair of rails 24 extending along sidewalls 26 in a rearward direction from front edge 14c, 16c. The rails project laterally outward from each sidewall 26 to form a T-shaped configuration. Rails 24 have holding surfaces 25 that are spaced from and facing outer face 14b, 16b. As discussed below, rails 24 cooperate with wear member or (in this case) shroud 28 to prevent its movement away from the lip. While a T-shaped configuration is preferred, the rails could have other shapes, such as dovetail. Moreover, for lower stress environments, the rails could be omitted entirely (not shown) so that only the sidewalls 26 defined the sides of the body.

A brace 30 extends laterally across the rear end of body 22. In the preferred construction, the rear ends of rails 24 are integrally fixed to a brace 30 to additionally support the rails when under load. Brace 30 further extends outward beyond the rails to define a stop surface 32 adapted to abut the rear end of shroud 28 and thereby reduce the stress on the boss, which in turn, reduces the stress along front edge 14c, 16c of lip 12. The use of a brace as an abutment and/or to support the rails has applicability in other arrangements for mounting wear members, such as disclosed in U.S. patent application Ser. No. 11/216,544, filed concurrently herewith and entitled "Wear Assembly for the Digging Edge of an Excavator" which is in its entirety hereby incorporated by reference.

Brace 30 also preferably has a greater depth than body 22 so that it extends from the lip a greater distance than the body to maximize the surface area able to abut the shroud and to function as a deflector for earthen material when the bucket is reversed to reduce reverse loading of shroud 28. A deflector face 34 inclined forward from outer face 14b, 16b is preferably formed along the rear side of brace 30 to direct the earthen material away from the assembled boss and shroud. Body 22 and brace 30 are formed as an open framework, with openings 36 to reduce the amount of needed steel and to facilitate welding of the boss to the lip.

A front part 38 of boss 20 wraps around front edge 14c, 16c of lip 12 to define a finger portion 39 along inner face 14a, 16a. Inner surface 40 of boss 20 (i.e., the surface that faces lip 12) is shaped to conform to the shape of the particular lip to which it is fixed. In this case, the inner face includes an upright face 42 to set against front edge 14c, 16c and an upper face 44 to set against ramp 46 of inner face 14a. In the

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preferred construction, the bosses attached to corner sections **16** are the same as those attached to center section **14**. However, other attachments are possible. If the front of the lip had a curved or other shape, inner surface **40** would be changed to match the shape of the lip. The front face **48** of boss **20** preferably has a uniform curved shape, but other shapes are possible. Alternatively, front part **38** could be formed to simply be upturned to abut against front edge **14c**, **16c** and not overlie inner face **14a**, **16a**. Also, front part **38** could be entirely omitted so that boss **20** only lies along outer face **14b**, **16b**. In addition, body **22** could be fixed to inner face **14a**, **16a** instead of outer face **14b**, **16b** if desired.

A recess **50** is formed in finger portion **39**. A hole **52** in body **22** is aligned with recess **60** to collectively define a passage **54** for receiving a lock **56**. In the preferred construction, recess **50** has a generally U-shaped configuration; though other shapes are possible. The main wall **57** of recess **50** is preferably aligned with upright face **42** for bearing against the lock. Hole **52** has a main portion **58** that preferably has a laterally elongated, generally rectangular shape; though other shapes are possible. The shapes of recess **50** and hole **52** are largely dependent on the shape of the lock. While hole **52** preferably extends through body **22**, it could have a closed lower end (which would result in the elimination of rib **62**). A pocket **60** is defined along a medial section of main portion **58** to receive a rib **62** of shroud **28**. A groove **64** is formed in front face **48** and through front part **38** to connect with main portion **58** of hole **52**. Groove **64** is provided to permit the passage of rib **62** to pocket **60** and is thus aligned with pocket **60**. Boss **20** is fixed to lip **12** such that recess **50** and hole **52** are centrally aligned with one of the scallops **18** (FIGS. 7 and 8).

In the preferred construction, shrouds **28** have a front working portion **66** that tapers to a narrowed front edge **68**, and a rear mounting portion **70** that is bifurcated to define an inner leg **72** and an outer leg **74** (FIGS. 13-18). Outer leg **74** has a generally flat outer face **76** and a rear deflector face **78** that is inclined forwardly away from lip **12** to direct any earthen material away from the wear member during reverse movement of the bucket. The inner face **80** preferably has a pair of dogleg flanges **82** that face inward to define a T-shaped slot **84** for receiving body **22** and rails **24**. Flanges **82** could vary in shape to define slot with a dovetail or other configurations which complement the shape of rails **24**, or to simply be upright when no rails are provided. Alternatively, the flanges could be replaced with a thicker outer leg that includes inner walls to form the slot receiving the boss **20**. Also, the tongue and groove arrangement could be reversed so that the boss was formed to define the slot and the wear member the tongue received into the slot (not shown).

Shroud **28** includes an inner surface **85** that includes inner face **80** of outer leg **74**, inner face **87** of inner leg **72**, and the inner corner surface **89** at the intersection of legs **72**, **74** (FIGS. 13-16 and 18). Inner corner surface **89** has a central section **89a** that generally matches front face **48** of boss **20** and abuts against it. Accordingly, in the preferred embodiment, inner corner surface **89** has a generally uniform curved surface. When assembled, inner face **80** of outer leg **74** overlies body **22** and outer face **14b**, **16b**, and inner face **87** of inner leg **72** overlies finger portion **39** and inner face **14a**, **16a** (FIGS. 16-18). Inside corner surface **89** also includes side sections **89b** that have a slightly narrower radius of curvature than central section **89a** to define side faces **91** that set just outside side surfaces **93** of front part **38** (FIGS. 3, 4 and 15). The juxtaposition of side faces **91** and side surfaces **93** will provide additional lateral support for shroud **28** at the front edge of lip **12**. Although all of the bosses **20** are preferably

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identical, a unique boss could be formed for the center of central section **14** of lip **12** where a peak **100** is formed. In this construction, the inner surface of the boss that wraps around the front edge of the lip would be formed with slight angle to match the formation of the lip. Inner leg **72** includes an aperture **86** adapted to receive lock **56** therein. As a result, aperture **86** is generally aligned with recess **50**, hole **52** and one of the scallops **18**. In the preferred embodiment, aperture **86** has a generally rectangular configuration (to match the preferred lock) with the rear wall **88** forming bearing faces to abut the lock. As described below, rear wall **88** and front wall **92** each include a central groove **94**, **96** (FIG. 13). Groove **94** is formed to provide clearance for the movement of an elastomer in the lock. Groove **96** is provided to permit the insertion of a pry tool for removing the lock. The rear and front walls **88**, **92** of aperture **86** preferably converge toward each other as they extend toward boss **20** to receive a tapered lock that can be pried into and out of the assembly. A rib **62** projects upward from inner face **80** to abut the lower end of lock **56**.

When shroud **28** is installed, it is slid over lip **12** such that inner and outer legs **72**, **74** straddle the lip (FIG. 1). Rails **24** of body **22** are fit within slot **84** as shroud **28** is moved rearward (FIG. 18). The rearward movement is continued until inside corner surface **89** abuts front face **48** of boss **20** (FIGS. 16-18). At this juncture, rear wall **98** of outer leg **74** is preferably placed in close proximity to stop surface **32**. With cast parts, it is not practical for inside corner surface **89** and rear wall **98** to simultaneously abut front face **48** and stop surface **32**, respectively. However, by placing rear wall **98** in close proximity with stop surface **32**, the two surfaces will typically abut after a short amount of time as wear develops in the parts. While it is not preferred, stop surface **32** could be the primary bearing surface that first abuts rear wall **98**, with inside corner surface **89** abutting front face **48** after some wear. Also, as shroud **28** is installed, rib **62** passes through groove **64** in front part **38** of boss **20**, through main portion **58** of hole **52**, and into pocket **60**.

Once shroud **28** is fully pushed onto boss **20**, lock **56** is inserted into aperture **86**, recess **50**, hole **52** and one of the scallops **18** (FIGS. 16-18). As seen in FIGS. 9-12, lock **56** preferably has a rigid body **102**, a latch **104** and an elastomeric member (not shown). In the preferred construction, body **102** has a gradually tapering shape with front and rear walls **106**, **108** that converge as they extend toward leading face **110**. Rear wall **108** is divided by a step **112** into an upper or inner section **108a** and a lower or outer section **108b**. Preferably the inner and outer sections **108a**, **108b** are generally parallel to each other, although they could have differing orientations. Inner section **108a** is adapted to set against rear wall **88** in aperture **86**, and outer section **108b** against the front face **114** of rib **62**. Accordingly, rear wall **88** and front face **114** are preferably inclined to match the inclination of rear wall **108**. As disclosed in U.S. patent application Ser. No. 10/187,446 filed Jul. 2, 2002, entitled "Coupling for Excavating Wear Part," which is hereby incorporated by reference in its entirety, this mating relationship of a tapered lock with the opening into which it is received eases the insertion and removal of the lock; that is, since the lock walls do not fully engage the opening walls until the lock is fully set in the assembly, the necessity for using a large hammer to insert the lock is obviated. Rather, in certain environments, it is possible to manually insert the lock into the assembly without tools. Alternatively, a pry tool may be used. In the example illustrated in FIG. 19, a prying ledge **115** is provided on a lifting eye **117**. A pry tool **119** can engage prying ledge **115** to push lock **56** into the assembly. Of course, other prying arrange-

ments are possible, and a hammer could be used if desired. Similarly, since the lock will release from the opening walls immediately after being moved in the release direction, the lock can be pried out of the assembly.

The use of step 112 permits a larger, more robust portion of the lock to be fit within aperture 86 and to include a cavity 116 to contain the elastomeric material (not shown). The narrower portion below step 112 permits the use of a scallop 18 having minimal depth. When assembled, scallop wall 19 is juxtaposed to outer section 108b just below step 112 (FIGS. 11-12). Rib 62 sets just below lip 12 so that the inner or top surface 118 is juxtaposed to outer surface 14b, 16b of lip 12 (FIG. 16). Step 112 generally parallels ramp 46 in a spaced relation (FIGS. 11-12). Front wall 106 abuts against main wall 57 in recess 50 of boss 20 and front wall 120 of hole 52 (FIGS. 3 and 17-19). As can be appreciated, the lock, along both front wall 106 and rear wall 108 abuts shroud 28 and boss 20 inside and outside of lip 12 (i.e., to each side of a central plane of the main member 14 or corner member 16 between inner face 14a, 16a and outer face 14b, 16b) for a more stable and balanced locking arrangement than the prior art assemblies.

Latch 104 is preferably pivotally mounted within cavity 116 of body 102 (FIGS. 9-10). In particular, latch 104 includes a pivot pin 122 that fits within a lateral recess 124, a stem 126, and a head 128. Head 128 includes a shoulder 130 that projects outward beyond front wall 106 to fit under keeper ledge 59 to retain lock 56 in the wear assembly. An elastomeric material (not shown), such as rubber, is fit within cavity 116 behind latch 104. The elastomer normally biases latch 104 outward in a locked position, as shown in FIG. 10. The leading or lower surface 132 of shoulder 130 has a curved configuration to guide the latch rearward as it strikes against shroud 28 as it is inserted into aperture 86 so that shoulder 130 is pushed within cavity 116. When the lock is fully inserted into the assembly, the elastomer biases the latch outward so that shoulder 130 fits under keeper ledge 59. In the preferred construction, the elastomer is affixed to the rear wall of latch 104 and within cavity 116 by adhesive or molding. Alternatively, the elastomer could be held within cavity by friction and/or mechanical means.

To facilitate removal of lock 56, shroud 28 includes groove 96 to permit the insertion of a tool (not shown) to push the latch rearward against the bias of the elastomer (FIGS. 9, 13, 16 and 17); that is, the tool presses against the front face 134 of head 128 with leverage against the front wall 136 of groove 96. Front wall 136 is curved inward to better guide latch 104 rearward, and provide a better leverage surface for the tool. Head 128 preferably also includes a pry surface 138 under front face 134, whereby the tool pushing the latch rearward can be further rotated against front wall 136 to pry the lock from the assembly (FIGS. 9 and 10); that is, the free end of the tool engages pry surface 138 so that as the tool continues to rotate it applies an upward force on the latch. The pivot pin 122 being received within recess 124 provides the needed resistance to permit such prying on the latch. In general, a pry tool (not shown) can be fit into groove 96 with a pry surface (not shown) to pull the lock from the assembly.

Shrouds 28 are preferably formed of two different constructions along their sides. As seen in FIGS. 1 and 13-16, one kind of shroud 28 includes grooves 142 which receive tongues 144 from the other kind of shroud 28' (FIG. 1). In this way, the shrouds mate together, with the tongues 144 in grooves 142 to provide a more integral assembly and better cover front edge 14c of lip 12. A third kind of shroud 28" can be formed without grooves 142 or tongues 144 for attachment to corner sections 16. Nevertheless, a shroud of a single shape

of can be used if desired. For instance, each shroud can be formed with a groove on side and a tongue on the other, or each could be formed without either a groove or tongue.

The invention claimed is:

1. A lip of an excavating bucket having an interior scoop structure and an exterior surface, the lip comprising:
 - a base member having an inner face adapted to form a part of the interior scoop structure of the bucket, an outer face adapted to form a part of the exterior of the bucket, and a front edge face extending across the front of the base member and interconnecting the inner and outer faces, the front edge face including a recess; and
 - a boss fixed to the base member and including a front part extending generally along the front edge face, and a body extending rearwardly from the front part along one of the inner and outer faces of the base member, the boss defining a hole forward of the front edge face and in general alignment with the recess to receive a lock through the hole and the recess to secure a wear member to the lip, and the boss including a longitudinal coupling structure that slidably connects with a complementary coupling structure of a wear member to mount the wear member to the lip.
2. The lip in accordance with claim 1 in which the recess is defined by a concave wall having a length extending no more than about 180 degrees generally around an axis of the recess and extending generally perpendicular to the base member.
3. The lip in accordance with claim 2 wherein the concave wall of said recess has a generally continuous, uniform curvature.
4. The lip in accordance with claim 1 wherein the boss includes a generally rearward facing bearing surface in the hole to abut a lock holding the wear member to the lip.
5. The lip in accordance with claim 1 in which the base member includes a main member that extends across the expanse of the interior scoop structure and a corner member at each end of a main member, wherein each said corner member extends generally transverse to the main member, and wherein the main member and each said corner member includes a part of the front edge face that has at least one of the recesses and one of said bosses.
6. The lip in accordance with claim 1 wherein the longitudinal coupling structure is one part of a tongue and groove coupling structure.
7. A wear member for attachment to a lip of an excavating bucket, wherein the lip has a front edge, the wear member comprising a front working portion and a rear mounting portion, the rear mounting portion including a pair of legs that straddle the lip, one of the legs including one part of a tongue and groove coupling structure having a front end and a rear end, the coupling structure being adapted to slide rearwardly over the lip to engage a complementary formation on a base fixed the lip, each said leg including a bearing surface, said bearing surfaces facing in a forward direction and being generally aligned to engage a lock to hold the wear member to the lip, and one said bearing surface being proximate the front end of the coupling structure.
8. The wear member in accordance with claim 7 wherein the coupling structure includes a pair of opposite rails.
9. The wear member in accordance with claim 8 wherein the rails and the respective leg collectively define a generally T-shaped configuration.
10. The wear member in accordance with claim 7 wherein the leg opposite the leg with the coupling structure includes an opening through which the lock is received.
11. The wear member in accordance with claim 10 wherein a rear wall of the opening defines one of the bearing surfaces.

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12. The wear member in accordance with claim 11 wherein the leg with the coupling structure includes a rib extending generally toward the opening, and a front wall of the rib defines the other of the bearing surfaces.

13. A wear member for mounting on a digging edge of 5 excavating equipment comprising:

a front working portion;

a rear mounting portion including a pair of rearwardly extending legs to straddle the digging edge, each of the legs having an inner surface facing the other leg, and a 10 corner surface interconnecting the inner surfaces of the legs;

one part of a tongue and groove coupling structure formed along the inner surface of only a first one of the legs to couple to a complementary part of a tongue and groove 15 coupling structure formed on a boss fixed to the digging edge;

an opening in a second one of the legs for receiving a lock, the opening having a forward facing bearing surface to contact the lock and hold the wear member to the dig- 20 ging edge; and

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a cavity formed in the corner surface to receive a portion of the boss, the cavity having a pair of opposing sidewalls extending transverse to the inner surfaces to engage side surfaces of the boss for lateral support of the wear member.

14. The wear member in accordance with claim 13 which is a shroud wherein the working portion is a wearable tip that tapers to a free end.

15. The wear member in accordance with claim 13, wherein the corner surface has a generally uniform curved surface to abut a correspondingly curved front part of the boss fixed to the digging edge.

16. The wear member in accordance with claim 13 including a rear deflector face at a rear end that is inclined forwardly away from the lip to direct earthen material away from the wear member during reverse movement of the excavating equipment.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 7,451,558 B2
APPLICATION NO. : 11/216697
DATED : November 1, 2008
INVENTOR(S) : Darren F. Jones

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In Column 8, line 55, "look" should be changed to --lock--.

Signed and Sealed this

Tenth Day of November, 2009

A handwritten signature in black ink that reads "David J. Kappos". The signature is written in a cursive, flowing style.

David J. Kappos
Director of the United States Patent and Trademark Office